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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/787,311	10/03/2001	Jonathan Mark Cooper	9013.27	8228

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MYERS BIGEL SIBLEY & SAJOVEC
PO BOX 37428
RALEIGH, NC 27627

EXAMINER	
HANDY, DWAYNE K	
ART UNIT	**PAPER NUMBER**
1743	8

DATE MAILED: 06/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/787,311	COOPER ET AL.	
	Examiner	Art Unit	
	Dwayne K Handy	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-8, 12, 14-17 and 19-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Sunshine et al. (6,085,576). Sunshine et al. teach a handheld vapor sensing apparatus. The device is comprised of a sensor module that has a sample chamber and a plurality of sensors located on a chip. Vapors pass through the sample chamber and the sensor array then provide a distinct combination of electrical signals in response to the sample (Abstract). The device is best shown in Figures 7A-8B and described in columns 9-11. Figures 7A-7C show a sensor module (150b) with two sample chambers (710a, 710b) containing sensor array devices (720). The sensor array devices are described in column 10:

> (29) The e-nose device of the invention includes an array of sensors and, in certain instances, the sensors as described in U.S. Pat. No. 5,571,401 are used. Various sensors suitable for detection of analytes include, but are not limited to: **surface acoustic wave (SAW) sensors; quartz microbalance sensors; conductive composites; chemiresistors**; metal oxide gas sensors, such as tin oxide gas sensors; organic gas sensors; metal oxide field effect transistor (MOSFET); piezoelectric devices; infrared sensors;

(30) sintered metal oxide sensors; Pd-gate MOSFET; metal FET structures; metal oxide sensors, such as a Tuguchi gas sensors; phthalocyanine sensors; electrochemical cells;

(31) conducting polymer sensors; catalytic gas sensors; organic semiconducting gas sensors;

(32) solid electrolyte gas sensors; piezoelectric quartz crystal sensors; and Langmuir-Blodgett film sensors.

(33) In a preferred embodiment, the sensors of the present invention are disclosed in U.S. Pat. No. 5,571,401, incorporated herein by reference. Briefly, the sensors described therein are conducting materials and nonconducting materials arranged in a matrix of conducting and nonconducting regions. The nonconductive material can be a nonconducting polymer such as polystyrene. The conductive material can be a conducting polymer, carbon black, an inorganic conductor and the like. The sensor arrays comprise at least two sensors, typically about 32 sensors, and in certain instances 1000 sensors. The array of sensors can be formed on an integrated circuit using semiconductor technology methods, an example of which is disclosed in PCT Patent Application Ser. No. WO99/08105, entitled "Techniques and Systems for Analyte Detection," published Feb. 19, 1999, and incorporate herein by reference.

(34) In certain instances, the handheld device of the present invention comprises an **array of surface acoustic wave (SAW) sensors, preferably polymer-coated (SAW) sensors**. The (SAW) device contains up to six and typically about four sensors in the array. Optionally, the device includes a preconcentrator with a heater for desorption of the sample.

(35) As will be apparent to those of skill in the art, the sensors making up the array of the present invention can be made up of various sensor types as set forth above. For instance, the sensor array can comprise a **conducting/nonconducting regions sensor, a (SAW) sensor**, a metal oxide gas sensor, a conducting polymer sensor, a Langmuir-Blodgett film sensor, **and combinations thereof.**

Sunshine, then, teaches a sensor array device which contains both a volume changing conductive/non-conductive polymer sensor (chemiresistor) as well as a sensor hat responds to a change in mass (SAW sensors). The chemiresistor is comprised of a matrix of conducting and non-conducting regions of polymers that may include carbon black. The mass changing sensor is either a SAW sensor or quartz microbalance. Sunshine describes passing the analytes of interest over the sensor array in column 9,

lines 29-54. Computer use is detailed in column 11 and includes the use of serial and parallel cables for processing response data.

3. Claims 1-3, 5-7, 10-12 and 14-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Doleman et al. (6,571,603). Doleman et al. teach a method of resolving analytes in a fluid. The method includes the use of a sensor array of different types of sensors on one sensing unit. The sensing device is shown in general in Figure 1 and described in columns 3 and 11. From column 3:

> (2) In accordance with the present invention, an array 10 of sensors is disposed on a substrate, such as shown in FIG. 1. Each sensor is responsive to different odor analytes in a particular manner so that the response of all the sensors creates a "fingerprint" which can be used to identify the analyte. These sensors may include **surface acoustic wave (SAW) devices**, tin oxide detectors, **conducting organic polymers, dye-impregnated polymer films on fiber optic detectors**, polymer-coated micromirrors, **quartz crystal microbalances (QCMs)**, electrochemical gas detectors, chemically sensitive field-effect transistors, **carbon black-polymer composite chemiresistors**, micro-electro-mechanical system (MEMs) devices, and micro-opto-electro-mechanical system (MOEMs) devices. If the devices are compatible, the **sensors might be placed on a single substrate**, such as that of semiconductor material, for the benefits of miniaturization and convenience. Each of the sensors is connected by wires through an array interface 12 to a computer unit 1 which **receives the electrical responses from the sensors upon exposure to an odor analyte. The computer unit is programmed to save and process the data in accordance with the data processing steps set forth below**. The results may be displayed on a screen 5 of the computer unit's monitor and/or saved in memory, such as represented by a computer disk 15.

Doleman teaches the measuring of voltage, current, capacitance or inductance in analyte determination in column 4, lines 20-26.

Inventorship

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sunshine et al. (6,085,576) in view of Lewis (6,013,229). Sunshine, as described above, teaches every element of claim 9 except for the use of interdigitated electrodes. Lewis teaches

a sensor array comprised of a wide variety of sensor types on a substrate. In describing the synthesis of their array, Lewis et al disclose the use of interdigitated electrodes coated by organic polymer films (column 8, lines 23-55 and column 14, lines 19-43). The electrodes are covered with polymer through dipping or spraying in order to incorporate the sensors into a commercial bus strip. It would have been obvious to one of ordinary skill in the art to combine the interdigitated electrodes from Lewis with the device of Sunshine. The addition of interdigitated electrodes would allow a series of electrodes to be used in an array on a single substrate.

7. Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sunshine et al. (6,085,576) in view of Frye et al. (5,589,356). Sunshine, as described above, teaches every element of claims 13 and 18 except for a polymer coating over the sensor. Frye et al. teach coatings for use as a discriminating element in acoustic wave sensors. The coatings provide selectivity to the sensor through tailored porosity and pore size distribution (column 5, lines 39-52). This leads to improved discrimination and greater selectivity of the sensor. It would have been obvious to one of ordinary skill in the art to combine the coating of Frye with the sensor array of Sunshine. The addition of the coating from Frye would improve the selectivity of the sensor array.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Grate et al. (6,408,250) disclose a method for identifying unknowns with a SAW device. Wohltjen (4,759,210) shows a basic gas monitoring apparatus. Rose-Pehrsson et al. (5,469,369) and Fu (6,598,459) teach vapor detection systems comprised of acoustic sensors. Lewis et al. (6,610,367; 5,571,401) and Sunshine et al. (6,422,061) show sensor arrays comprised primarily of composite polymer materials.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwayne K Handy whose telephone number is (571)-272-1259. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DKH
June 14, 2004

Jill Warden
Supervisory Patent Examiner
Technology Center 1700